Remarks

Reconsideration of pending Claims 1-2, 4-23, 26-28, 30-34, 50-55, and 57-65, and 69-78 is respectfully requested.

Claims 1, 4, 9, 11-13, 18, 22, 28, 30-32, 64, 69-71, 74-78 have been amended. Support for the amendments to the claims is in the claims as originally filed, the figures and throughout the specification. The amendments are intended to merely clarify language used in the claims, and the scope of the claims is intended to be the same as it was before the amendment in accordance with the invention. No new matter has been added with the amendments.

Claim Objections

The Examiner objected to Claims 4, 30 and 31 for incorrect dependent form. These claims have been amended to correction recite their dependency. Accordingly, withdrawal of the Examiner objections is requested.

Rejections under 35 U.S.C. § 102(b) (Preslar)

The Examiner rejected Claims 28, 30-34, 74, and 76 as anticipated by USP 5,900,643 (Preslar). Insofar as this rejection is maintained with respect to the claims as amended, this rejection is respectfully traversed.

Claims 28, 32, 74 and 76 have been amended to more clearly recite that one bond pad is functional only in an operational mode, and the second bond pad is functional in a test mode and in an operation mode.

Preslar does not teach or suggest a bond pad structure as claimed. Accordingly, withdrawal of the rejection of the claims based on Preslar is respectfully requested.

Rejections under 35 U.S.C. § 102(e) (Muramatsu)

The Examiner rejected Claims 1 2, 4 and 9 as anticipated by USP 6,420,664 (Muramatsu). This rejection is respectfully traversed.

The Examiner cites Muramatsu as disclosing all of the elements of the claims. At page 22 of the Office Action, the Examiner states:

> ...The element 26 of Muramatsu et al. are metal pattern exposed on a chip (10) through openings (at the place of the elements 24) etched into a passivation layer (30) deposited onto a

PAGE 13/17 * RCVD AT 11/16/2004 12:28:17 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:414 223 5000 * DURATION (mm-ss):05-06

chip surface for external connection such as solder ball (24). Thus, the elements (26) read as bond pads.

Claims 1, 2, 4 and 9 have been amended to clarify that the bond pad structure is *part of* a semiconductor die.

By comparison, the wiring element (26) of Muramatsu is not part of a die — it is part of a *circuit structure(40)* that is adhered to a die. The Examiner erroneously equates the circuit substrate (40) with a bond pad structure of a die or chip.

The Examiner is directed to FIGS. 19(a1) to 19(c), which illustrate Muramatsu's method of manufacturing a semiconductor device. The method is described at col. 15, lines 7-16 (emphasis added):

> Method of Manufacturing Semiconductor Devices
> ...
> FIGS. 19(a1) to 19(c) are views showing a method by which the semiconductor device 50 is formed *by making the circuit substrate 40 adhere to the semiconductor chip 10*. The **semiconductor chip 10** and **the circuit substrate 40** are positioned with each other as shown in FIGS. 19(a1) and 19(a2), and *the circuit substrate 40 is made to adhere to the semiconductor chip 10* as shown in FIG. 19(b)...

FIG. 19(a1) illustrates chip (1) with electrode terminals (12).

FIG. 19(a2) illustrates the circuit substrate (40) with wiring elements (26).

FIG.19(b) shows chip (1) attached to the circuit substrate (40) by means of the adhesive layer (18). The wiring elements (26) are attached to the electrode terminals (12) of the chip (1).

Fig.19(a1)

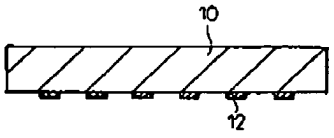
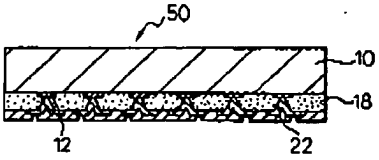


Fig.19(a2)

Fig.19(b)



PAGE 14/17 * RCVD AT 11/16/2004 12:28:17 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:414 223 5000 * DURATION (mm-ss):05-06

The Examiner has again mischaracterized the meaning of a "bond pad" as that structure is understood in the art. The Examiner is again respectfully directed to Wolf and Tauber, *Silicon Processing for the VLSI Era* (vol. 1), Lattice Press, Sunset Beach, CA (2000) at pages 827-829, which describes bonding pads as metal patterns *exposed on a chip* through openings etched into a passivation layer deposited onto a wafer surface.[1] The bond pads of Muramatsu are equivalent to the electrode terminals (12) of chip (1) as illustrated in **FIG. 19(a1)** above.

Clearly, the circuit substrate (40) with wiring element (26):

-- is *not* part of a bond pad structure of the chip (1); and

-- is a separate structure that is adhered onto the die surface.

Muramatsu does not teach or suggest a bond pad structure as claimed. Accordingly, withdrawal of the rejection of the claims based on Muramatsu is respectfully requested.

Rejection under 35 U.S.C. §103(a) (Preslar with Goodner, and further with Geffken)

The Examiner newly rejected Claims 1, 2, 4, 5, 7-14, 16-19, 21, 50-53, 55, 57-65, 69, 70, 72, 73, and 75 under Section 103(a) as obvious over Preslar in view of USP 4,621,045 (Goodner). The Examiner admits that Preslar does not disclose a bond pad having a plurality of lower metal layers with an overlying upper metal layer, and cites Goodner for teaching this feature. The Examiner maintains that it would be obvious to modify Preslar to add another lower metal layer as taught by Goodner in **Fig. 2J**. (Office Action at page 9).

The Examiner also rejected Claims 6, 15, 20, 54, 77, and 78 under Section 103(a) as obvious over Preslar in view of Goodner, and further in view of Geffken. The Examiner also admits that neither Preslar nor Goodner disclose the conductive material comprising a solder material, but maintains that it would be obvious to modify Preslar to (a) add another lower metal layer based on Goodner, and (b) use a solder material for the conductive material based on Geffken on the basis that it would increase "the bond strength between the pads and the external device (e.g., wire)." (Office Action at page 19).

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[1] See also, Stanley Wolf, *Silicon Processing for the VLSI Era* (vol. 2), Lattice Press, Sunset Beach, CA (1990) at page 377. See also Peter Van Zant, Microchip Fabrication, 4th ed., McGraw Hill, New York, NY (2000): at pages 82-83 illustrating bonding pads (3) on a chip; at page 560: "...the chip wiring terminates in the larger bonding pads around the edge of the chip".

PAGE 15/17 * RCVD AT 11/16/2004 12:28:17 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:414 223 5000 * DURATION (mm-ss):05-06

These rejections are respectfully traversed.

The Examiner cites to Goodner at **Fig. 2J** for teaching a pad (4, 6, and 29b) having a plurality of lower metal layers (4 and 6) under an upper metal layer (29b).

The Examiner cites to col. 5, line 64 to col. 6, 2 (emphasis added)):

> **Upper metallization layer 29** is then applied as indicated in FIG. 2H, and patterned as shown in FIGS. 2I or J to provide upper interconnect 29a. In FIG. 2I that portion of layer 29 lying above **bonding pad 4, 6** is removed so that surface 6a (or 4a) is exposed and available for bonding. In FIG. 2J, portion 29b of layer 29 is left in place above surface 6a (or 4a). Either arrangement is useful and the choice may be made on the basis of whether the material of regions 4, 6 or 29b is more suitable for bonding.

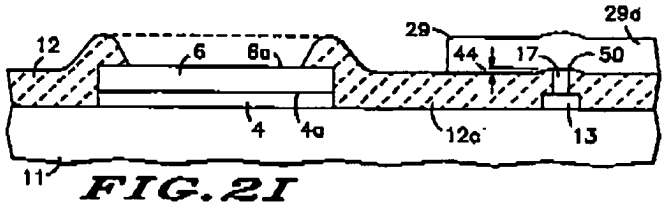

FIG. 2I

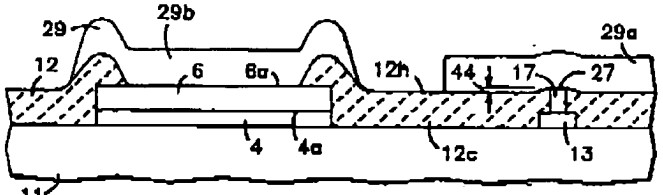

FIG. 2J

Goodner teaches a ***single*** bond pad having two overlying metal layers 4, 6, and an overlying metal interconnect layer 29.

Claim 1, for example, recites a bond pad structure comprising (emphasis added)

> **a first bond pad and a second bond pad**; each of the bond pads comprising a plurality of lower metal layers and an upper metal layer; with **at least one of the lower metal layers of one of the bond pads extending underneath the upper metal layer of the other of the bond pads**.

Goodner does not teach or suggest this bond pad structure.

The combination of Goodner with Preslar's structure would not provide Applicant's bond pad structure as claimed. Further, the teachings of Geffken do not make up for the deficiencies of either Goodner or Preslar to provide the claimed structure.

PAGE 16/17 * RCVD AT 11/16/2004 12:28:17 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:414 223 5000 * DURATION (mm-ss):05-06

Accordingly, withdrawal of the rejections of the claims based on Preslar in combination with Goodner alone or with Geffken is respectfully requested.

Rejection under 35 U.S.C. §103(a) (Preslar with Geffken)

The Examiner rejected Claims 22, 23, 26, 27, and 71 under Section 103(a) as obvious over Preslar in view of USP 5,883,435 (Geffken). This rejection is respectfully traversed.

Claims 22 and 71 have been amended to more clearly recite that the solder material *situated on* and interconnects the bond pads.

Preslar alone or combined with Geffken does not teach or suggest a bond pad structure as claimed. Accordingly, withdrawal of the rejection of the claims based on Preslar is respectfully requested.

Extension of Term. The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that a one (1) month extension of term is required, and hereby requests such extension and authorizes the extension fee to be charged to Account No. 23-2053. If any additional extension and/or fee are required, please consider this a petition therefore and charge the required fee(s) to Account No. 23-2053.

Based on the above remarks, the Examiner is again respectfully requested to reconsider and withdraw the rejections of the claims.

Respectfully submitted,

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Dated: November 15, 2004

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PAGE 17/17 * RCVD AT 11/16/2004 12:28:17 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:414 223 5000 * DURATION (mm-ss):05-06